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TITLE: Foaming of sodium percarbonate, for bleaching clothes  
etc. - involves thermally treating using horizontal-type  
rotary heater

7-20

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ABSTRACTED-PUB-NO: JP 01014103A

BASIC-ABSTRACT:

Sodium percarbonate is thermally treated using a horizontal type rotary heater, to effect foaming.

USE/ADVANTAGE - The sodium percarbonate is foamed and dissolved rapidly when it is added to water. Sodium percarbonate is used for bleaching agent for clothes, additive for dyeing agent, kitchen bleaching agent, etc. Sodiumpercarbonate is heated only by contacting with the sidewall of the cylindrical reactor, and sodium percarbonate grains are stirred mechanically. Over-supply of heat is avoided and equal heating is carried out. Decomposition loss of active enzyme is reduced and sodium percarbonate having good foaming properties can be obtd. with high yield. The method is useful for sodium and sodium percarbonate contg. soap, soluble inorganic salt (e.g., sodium sulphate, sodium bicarbonate, magnesium sulphate), anion surfactant, nonionic surfactant or ampho-teric surfactant.

Un an example, sodiumpercarbonate (active oxygen content 13.8%) 25 kg was put into horizontal type cylindrical heater (dia. 320 mm, length 1600 mm) having a heating jacket. With rotating (10 vol/min) the heating was started by passing through steam to the jacket. It was heated at 120 deg.C for 30 min. During heating, air of room temp. was blown in at 100 M (3)/hr from one side, and was exhausted from the other side. Obtd.foaming sodium percarbonate was colourless, active oxygen 12.3 %, foaming amount 7.2 ml/g.

TITLE-TERMS: FOAM SODIUM PERCARBONATE BLEACH CLOTHING THERMAL TREAT HORIZONTAL

TYPE ROTATING HEATER

DERWENT-CLASS: D25 E34

CPI-CODES: D11-B01B; E31-E;

CHEMICAL-CODES:

Chemical Indexing M3 \*01\*

Fragmentation Code

A111 A940 C106 C408 C530 C730 C801 C802 C803 C805

C807 M411 M781 M903 M904 Q272 Q273

Specific Compounds

03532U

Registry Numbers

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審査請求 未請求 発明の数 1 (全3頁)

⑬ 発明の名称 過炭酸ソーダの発泡化方法

⑰ 特 願 昭62-166879

⑱ 出 願 昭62(1987)7月6日

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## 明 細 書

## 1. [発明の名称]

過炭酸ソーダの発泡化方法

## 2. [特許請求の範囲]

過炭酸ソーダを槽型回転式加熱機を用いて加熱処理することを特徴とする過炭酸ソーダの発泡化方法。

## 3. [発明の詳細な説明]

本発明は水に添加した時に、発泡し、急速に溶解する発泡性過炭酸ソーダを製造するに関する。

従来から過炭酸ソーダは衣類の漂白剤、染剤への添加剤、台所用漂白剤として広く用いられている。

しかしながら衣類の漂白剤として用いる場合、水に過炭酸ソーダを完全に溶解してから衣類を浸漬するのが好ましく、この場合は何ら問題は生じないが、時には過炭酸ソーダが完全に溶解しない状態で衣類を浸漬したり、場合によっては衣類の上に直接過炭酸ソーダをふりかけたりすることがある。このような場合衣類に過炭酸ソーダが未溶解

のまま付着することになり、局部的な過漂白を起こしたり、ひいては衣類の強度低下を引き起こすと言う問題が多く生じている。

過炭酸ソーダの水への溶解性を良くすることによりかかる問題は解決される。過炭酸ソーダを発泡化すれば溶解性が良くなることは広く知られていることであり、又加熱処理すれば発泡化することも特公昭45-19965、特開昭50-70286、特開昭54-43199等により公知である。

これら公知の従来の方法は、過炭酸ソーダを流動層乾燥機、振動乾燥機等に入れ、熱風を送り、過炭酸ソーダを流動状にして、熱風で加熱処理する方法、たて型反応器(円筒状等)に過炭酸ソーダを入れ、反応器に付属したジャケットより加熱し、底部より不活性ガスを送り過炭酸ソーダを流動させて加熱処理する方法等である。いずれも過炭酸ソーダをガス体で流動させ乍ら加熱する方法である。かかる方法で所定の加熱温度時間条件で処理すると発泡性の過炭酸ソーダは得られるが、

有効酸素の損失が大きく発泡量が少なく且つ原因不明の着色を起こすと言う問題、同一条件で処理しても同じ発泡量の製品が必ずしも得られないと言う不均一発泡性の問題等々工業的に実施するに当たっては不都合な問題が多々存在する。

本発明者はこれらの問題点を解決すべく鋭意研究の結果、横型回転式加熱機を用いて加熱処理することにより、有効酸素の損失が少なく高効率で着色性のない均一な発泡性を有する過炭酸ソーダが得られることを見出し本発明に至った。

本発明に於て用いられる横型回転式加熱機とは、水平軸を中心に回転する円筒形横型の反応器部と同部の側壁を加熱する加熱用ジャケットより成っているものである。必要に応じ反応器部内部に加熱用蛇管を具備しても良い。ジャケット及び蛇管にスチーム又は加熱された熱媒を通すことにより過炭酸ソーダの加熱に必要な熱量が供給される。具体的には所謂ロータリーキルン型加熱機(炉)が好ましい。

円筒形反応器部に投入された過炭酸ソーダは反

応器部の回転により加熱された側壁及び蛇管に逐次均一に接触し加熱される。

本発明は回分式にも、連続式にも適用出来るが、連続式の方が好ましい。連続式の場合は、円筒形反応器部を多少傾斜させ、回転させ乍ら上方から過炭酸ソーダを連続的に一定量投入する。投入された過炭酸ソーダは回転に従って攪拌され乍ら加熱された円筒部の側壁及び蛇管に接触し加熱されて下方に移動し、下方から外部に排出される構造にしておくが良い。

加熱処理条件は従来公知の方法と同様でよく、加熱温度は $110 \sim 135^{\circ}\text{C}$ が好ましく、加熱時間は $5 \sim 60$ 分が好ましい。この加熱時間は過炭酸ソーダの粒子が所定の温度に達してからの所要時間である。

又加熱処理は適量の空気又は他の不活性ガスを加熱機に導入しつつ行う。導入する空気又は他の不活性ガスの流量は特に規定しないが、過炭酸ソーダ $1\text{ kg}$ 当たり $1 \sim 3\text{ M}^3/\text{hr}$ が好ましく又温度は室温から過炭酸ソーダの加熱処理温度の範囲が好

ましい。かくして発生する水蒸気が除去される。

又加熱機の回転速度は過炭酸ソーダの粒子が均一に加熱用側壁及び加熱用蛇管に接触するように攪拌されるに必要な速度であれば良い。通常周速度で $1 \sim 20\text{ m}/\text{分}$ の範囲が好ましい。

本発明に於ては、過炭酸ソーダは加熱された円筒形反応器部の側壁、及び蛇管に接触することによってのみ加熱されると共に過炭酸ソーダ粒子を機械的に攪拌しているため、従来公知の方法である熱風流動化加熱に比較して、熱量の過剰供給が行われることが少なく、且つ均一な加熱が行われるので、熱量過剰供給による活性酸素の分解損失が少なく高効率で均一な発泡性を有する発泡性過炭酸ソーダが得られるものと考えられる。

本発明は過炭酸ソーダ及び硫酸ナトリウム、炭酸ナトリウム、炭酸水素ナトリウム、ケイ酸ナトリウム、硫酸マグネシウム等々の可溶性無機塩、陰イオン性界面活性剤、非イオン性界面活性剤、両性界面活性剤、石鹼等を含有した過炭酸ソーダに適用出来る。

以下、実施例を示すが本発明はこれに制限されるものではない。

#### 実施例 1

加熱用ジャケットを具備した直径 $320\text{ mm}$ 、長さ $1600\text{ mm}$ の横型円筒形加熱機に過炭酸ソーダ(活性酸素含有量 $13.8\%$ ) $25\text{ kg}$ を入れ、 $10$ 回/分で回転させて攪拌し乍ら、ジャケットにスチームを通し加熱を開始し、 $120^{\circ}\text{C}$ に達してから $30$ 分間 $120^{\circ}\text{C}$ での加熱を続けた。この間室温の空気を $100\text{ M}^3/\text{hr}$ で一方より吹き込み、他端から排出を続けた。得られた発泡性過炭酸ソーダは着色がなく活性酸素 $12.3\%$ 、発泡量 $7.2\text{ ml/g}$ であった。

#### 実施例 2

実施例1で用いた加熱機を若干傾斜をつけて設置し、 $2$ 回/分で回転させ、ジャケットにスチームを通してから、加熱機の上方より過炭酸ソーダを $18\text{ kg/hr}$ の割合で連続的に投入し、下方より連続的に加熱処理された過炭酸ソーダを取り出した。加熱処理中は加熱機下方より室温の空気を $27\text{ M}^3/\text{hr}$ の流量で導入し、上方より排出し続けた。

下方より排出された過炭酸ソーダの温度は120℃であり、加熱機内で120℃に保たれている時間は15分であった。又その分析値は次の如くであった。

経過時間	活性酸素	発泡量	着色の有無
0	13.8	0	
1	12.9	4.5	着色なし
2	12.5	5.5	〃
3	12.6	5.5	〃
4	12.6	5.6	〃
5	12.8	5.5	〃

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

When it adds in water, it foams to this invention and it is related for manufacturing the foaming \*\*\*\* sodium carbonate which dissolves quickly.

Fault sodium carbonate is widely used from the former as the bleaching agent of clothing, the additive to a stain agent, and a bleaching agent for kitchens.

However, although it is desirable that clothing is immersed and a problem is not produced at all in this case after dissolving fault sodium carbonate in water completely when using as a bleaching agent of clothing, clothing may be immersed in the state where fault sodium carbonate occasionally does not dissolve completely, or direct fault sodium carbonate may be sprinkled on clothing depending on the case. In such a case, it will adhere, while fault sodium carbonate has not dissolved in clothing, and the problem referred to as starting local overbleaching, as a result causing the on-the-strength fall of clothing has arisen mostly.

This problem is solved by improving the solubility to the water of fault sodium carbonate. If fault sodium carbonate is foaming-ized, it will be that it is good, a bird clapper is large, and solubility is known, and if it heat-treats, foaming-izing is also well-known by JP,45-19965,B, JP,50-70286,A, JP,54-43199,A, etc.

These well-known conventional methods are the methods of building, putting fault sodium carbonate into mold reactor (the shape of a cylinder etc.), heating from the method of heat-treating by hot blast, and the jacket attached to the reactor, sending inert gas from a bottom, making fault sodium carbonate to put fault sodium carbonate into a fluidized-bed-drying machine, an oscillating dryer, etc., to send hot blast, to make fault sodium carbonate into the letter of a flow and flow, and heat-treating etc. It is the way all make fault sodium carbonate flow by atmosphere, and heat [ \*\* ] it. although the fault sodium carbonate of foaming nature will be obtained if it processes on heating temperature time conditions predetermined by this method -- loss of an available oxygen -- large -- the amount of foaming -- few -- and : cause -- \*\*, such as a problem of the uneven foaming nature referred to as that the product of the same amount of foaming is not necessarily obtained even if it processes on the problem and the same conditions which are referred to as : causing unknown coloring, -- in carrying out industrially, an inconvenient problem exists plentifully

That these troubles should be solved, wholeheartedly, as a result of research, by heat-treating using a horizontal-type rotating type heating machine, this invention person had efficient loss of an available oxygen few, found out that the fault sodium carbonate which has uniform foaming nature without coloring nature was obtained, and resulted in this invention.

The horizontal-type rotating type heating machine used in this invention consists of the jacket for heating which heats the side attachment wall of the reactor section of a cylindrical shape horizontal type, and the said division rotated focusing on a horizontal axis. You may provide the coil for heating inside the reactor section if needed. A heating value required for heating of fault sodium carbonate is supplied by letting steam or the heated heat carrier pass to a jacket and a coil. Specifically, the so-called rotary kiln type heating machine (furnace) is desirable.

Serially, the fault sodium carbonate thrown into the cylindrical shape reactor section contacts, and is heated by the side attachment wall and coil which were heated by rotation of the reactor section at homogeneity.

The continuous system is more desirable although this invention is applicable also to continuous system also at a batch process. In the case of continuous system, make some cylindrical shape reactor sections incline, it is made to rotate, and the constant-rate injection of the fault sodium carbonate is continuously carried out from the \*\* upper parts. As for the thrown-in fault sodium carbonate, it is good to be agitated according to rotation and to make it the structure which contacts the side attachment wall and coil of a body which were \*\* heated, is heated, moves below, and is discharged by the upper part shell exterior.

Heat-treatment conditions are the same as that of a well-known method conventionally, and are good, heating

temperature has desirable 110-135 degrees C, and heating time's 5 - 60 minutes are desirable. This heating time is a duration after the particle of fault sodium carbonate reaches predetermined temperature.

Moreover, it is performed, heat-treatment introducing the air or other inert gas of a proper quantity into a heater. Although especially the flow rate of the air to introduce or other inert gas is not specified, per 1kg of fault sodium carbonate, 1-3M3/hr is desirable and the range of temperature of the heat-treatment temperature of a room temperature to fault sodium carbonate is desirable again. The steam generated in this way is removed.

Moreover, the rotational speed of a heating machine should just be a speed required to be agitated, as the particle of fault sodium carbonate contacts the side attachment wall for heating, and the coil for heating uniformly. Usually, 1-20n range for /is desirable at peripheral velocity.

While fault sodium carbonate is accepted and heated in this invention by contacting the side attachment wall of the heated cylindrical shape reactor section, and a coil. Since the fault sodium carbonate particle is agitated mechanically and heating with it is conventionally performed as compared with hot blast fluidization heating which is a well-known method, decomposition loss of the active oxygen by heating-value overage is considered that the foaming \*\*\*\* sodium carbonate which has foaming nature it is few and efficient and uniform is obtained. [ it rare / to perform the overage of a heating value / and and ] [ uniform ]

this invention is applicable to the fault sodium carbonate containing the fusibility mineral salt of \*\* and anionic detergents, such as fault sodium carbonate and a sodium sulfate, a sodium carbonate, a sodium hydrogencarbonate, a sodium silicate, and magnesium sulfate, a nonionic surfactant, an amphoteric surface active agent, soap, etc.

Hereafter, although an example is shown, this invention is not restricted to this.

Example 1 Put 25kg (13.8% of active oxygen contents) of fault sodium carbonate into the horizontal-type cylindrical shape heating machine with a diameter [ of 320mm ], and a length of 1600mm possessing the jacket for heating, and it was made to rotate by part for /10 times, and agitated, and heating at 120 degrees C was continued for 30 minutes after starting through heating in \*\* et al. and a jacket and reaching them in steam at 120 degrees C. The air of a room temperature was blown from one side by 100M3/hr in the meantime, and discharge was continued from the other end. The obtained foaming \*\*\*\* sodium carbonate did not have coloring, and was 12.3% of active oxygen, and amount of foaming 7.2 ml/g.

Example 2 After attaching the inclination, installing a little the heating machine used in the example 1, making it rotate by part for /twice and letting steam pass in a jacket, 18 kg/hr came out comparatively, fault sodium carbonate was thrown in continuously, and the fault sodium carbonate heat-treated more nearly continuously than a lower part was taken out from the upper part of a heating machine. During heat-treatment, the air of a room temperature is introduced by the flow rate of 27M3/hr from a heating machine lower part, and it continued discharging from information. The temperature of the fault sodium carbonate discharged from the lower part was 120 degrees C, and the time currently kept at 120 degrees C by the heating inside of a plane was 15 minutes. Moreover, the analysis value was as following.

経過時間	活性酸素	発泡量	着色の有無
hr	%	ml/g	
0	13.8	0	
1	12.9	4.5	着色なし
2	12.5	5.5	//
3	12.6	5.5	//
4	12.6	5.6	//
5	12.6	5.5	//

[Translation done.]